LAMINATED BOARD HAVING GYPSUM CORE AND WOOD VENEER LAMINATION WITH DEBOSSED DESIGNS

BACKGROUND OF THE INVENTION

1. Field of Invention

The present invention relates to a process for laminating a wood veneer to a gypsum board or drywall and impressing or debossing decorative patterns or designs into the wood veneer laminated gypsum board or drywall and relates to the product formed by the process.

2. Background of the Prior Invention

Several techniques have been proposed in the prior art for impressing or debossing decorative designs directly into gypsum board. Examples of the prior art techniques are disclosed in U.S. Pat. Nos. 1,871,843 and 1,943,663 to Ericson, 2,803,188 to Duvall, 3,630,817 to Winkowski, 4,007,076 to Clarke et al., 4,073,230 to Akerson, and 4,608,108 to Goll; and Great Britain Patent Publication No. 1,012,254.

More specifically, in one prior art technique, decorative impressions are debossed into the board while the core gypsum material is still in a plastic state during its initial manufacture as disclosed, for example, in U.S. Pat. Nos. 1,943,663 to Ericson and 4,608,108 to Goll. Experiences indicate that this technique is difficult to control because the core gypsum material hardens unevenly.

In another prior art technique a board or like material is debossed by wetting the board with a vaporized or vaporizable liquid agent such as steam or water or water soluble wetting solution and then heatpressing the wet board for a predetermined time, as disclosed, for example, in U.S. Pat. Nos. 1,871,843 to Ericson, 2,803,188 to Duvall, 4,007,076 to Clarke et al, and 4,073,230 to Akerson. In such a process, the steam or the water, which vaporizes into steam when heated during the debossing stage, is designed to enter the pores of the paper coat of the gypsum board and to plasticize its interior. The plasticization of the board permits decorative patterns to be debossed.

In another prior technique, an outer paperlike covering layer of a gypsum board is lightly debossed with a heated press without using steam or water, as disclosed in U.S. Pat. No. 4,110,507 to Colledge. A decorative pattern of wood grain is formed on the outer covering layer.

Yet in another prior technique, a water barrier layer of an acrylic film or the like material is formed on the board. Printing designs are debossed into the film covered board prior to the film fully setting as disclosed, for example, in U.S. Pat. Nos 3,630,817 to Winkowski.

Laminating a wood veneer and the like to a board or pre-debossed board, such as plywood and chip board and the like, is known, as disclosed, for example, in U.S. Pat. Nos. 4,853,062 to Gartland, 4,812,188 to Hansen, 4,844,968 to Persson et al., 4,142,007 to Lampe et al, and 3,846,219 and 3,793,125 to Kunz.

A use of a metallic foil as a separation layer in a laminated board is also disclosed, for example, in U.S. Pat. Nos. 3,793,125 to Kunz, and 4,153,490 to Werz et al. It is also known to bond an aluminum overlay with a wooden product before shaping the wooden product with a press, as disclosed, for example, in U.S. Pat. No. 3,480,501 to Burch.

None of these prior inventions, however, disclose a process for debossing a decorative wood veneer laminated gypsum board with printing designs; nor do they disclose a debossed wood veneer laminated gypsum board. Furthermore, none of these prior inventions disclose the use of a metallic layer between the wood veneer and the gypsum board to enable the wood veneer to be debossed without damaging the wood veneer during the debossing stage.

SUMMARY OF INVENTION

The wood veneer laminated gypsum board comprises a gypsum core having a paper or a paper-like outer layer on both sides, an aluminum backed wood veneer bonded to one side of the paper outer layer, although the aluminum backed wood veneer can be bonded to both sides, and designs debossed on the wood veneer which penetrate below the surface of the gypsum board.

The wood veneer laminated gypsum board is formed by spraying or applying a mixture comprising an adhesive diluted with a liquid softening agent, which may include water or water mixed with other materials, on the aluminum side of the aluminum-backed wood veneer. The paper or paper-like outer covering of the gypsum board is lightly sprayed or coated with a softening agent. The coated aluminum backed wood veneer is then placed on the lightly-coated gypsum board. A liquid is then applied to the wood veneer to moisten the wood. The wood veneer covered gypsum board is then pressed at appropriate levels of heat for a predetermined period.

Excellent results have been achieved by this process. In fact, the above process has resulted in 100% adhesion of the veneer layer to the gypsum outer paper, as well as a very clean and concise pattern being formed in the debossed wood veneer without tearing or bubbling of the wood veneer. Specifically, the application of heat during pressing, and following the penetration of the softening agent through the outer covering paper and into the gypsum core, vaporizes the softening agent. As a result, elasticity is provided to the board paper covering and to the gypsum core. The vaporized softening agent thus promotes stretching of the face paper and softening of the gypsum core when decorative patterns are impressed onto the board. The vaporization of the elasticity-promoting softening agent inside the gypsum board permits decorative patterns to be impressed or debossed into the gypsum substructure without impairing the integrity of the board product.

Similarly, the liquid applied to the wood veneer soaks through the wood to allow the wood to become elastic and thus promotes stretching during the debossing process. At the same time, the aluminum backing underlying the wood veneer prevents the wood from cracking or breaking. The stretching of the wood enables the wood veneer to be debossed with a very clean and concise pattern without tearing or bubbling.

The apparatus for carrying out the above process includes (1) a staging table with rollers onto which a group of stacked gypsum boards are received and transferred to (2) an adjustable feed station for selecting and moving the top board of the group to (3) a brushing station for removal of any dust or foreign matter from the board, (4) a disc conveyor which moves each board under a sprayer element for applying the softening agent to the board, (5) an aluminum backed wood veneer applying station, (6) a heating and pressing station to impress the decorative patterns into the board, and (7) a collection station to stack the processed boards into groups. Subsequent to processing, the boards may be cut to the required size.

An object of the present invention is to provide a process for debossing decorative designs and patterns onto a wood veneer outer layer formed on a gypsum board.